OROPHARYNGEAL AIRWAY AND BITE BLOCK ASSEMBLY AND METHOD OF USE FOR CLOSED PULMONARY VENTILATION

BACKGROUND OF THE INVENTION

This invention relates to improvements in means for providing closed artificial pulmonary ventilation to patients, such as during the administration of pressurized air for forced ventilation or resuscitation or during the administration of unpressurized oxygen or oxygen-enriched air where leakage to or from the atmosphere must be prevented because of the non-atmospheric nature (either due to pressure or composition) of the gases being administered. More particularly, the invention relates to a method and apparatus for providing closed pulmonary ventilation by means of an oropharyngeal airway in combination with a sealing bite block.

Conventionally, either a face mask or an endotracheal tube may be used as a means for providing closed ventilation by sealed means, allowing gases of predetermined mixture or pressure to be introduced or forced into the lungs. Either of these two conventional methods, however, has serious disadvantages.

The use of a mask to seal around oral and nasal openings to allow introduction of gases from a resuscitator may be somewhat frightening to patients who are in a semi-conscious state. Another common problem with the use of a mask is that it does not fit well on some patients, especially those who are edentulous, since there is less support of the external facial tissues for forming a seal around the edge of the mask, and therefore an undesirable amount of leakage, either from or to the atmosphere, occurs. Also, during use of a mask the tongue or lips of the patient may interfere with passage of air and prevent ventilation.

Endotracheal intubation provides the ideal system of closed pulmonary ventilation insofar as efficiency of ventilation is concerned, but it has the serious drawback that it is occasionally difficult to achieve, and that the patient may experience long-lasting residual hoarseness caused by irritation of the vocal cords by the endotracheal tube.

Use of an ordinary oropharyngeal airway tube avoids the problem or hoarseness, but again presents the problem of leakage, as there is no nasal or oral seal. Another common problem with the use of ordinary oropharyngeal airways is that a patient in convulsion, particularly that caused during electro-convulsive therapy, can bite down on the airway tube, occluding the air passage.

The Buttaravoli U.S. Pat. No. 3,809,079 describes a flexible face mask combined with an oropharyngeal airway. While this does provide a method of sealing around the nose and mouth of some patients so that closed pulmonary ventilation may be accomplished using an oropharyngeal airway, it still has all of the above mentioned disadvantages of use of a face mask in that it may cause fright in a semi-conscious patient, and gives no improvement over a mask alone in obtaining a sealing fit in edentulous patients.

Conventional bite block and airway tube assemblies, such as that shown in the Carpenter U.S. Pat. No. 2,669,988, have previously been used only to insure access of the oral passageway to atmospheric air (rather than to seal the oral passageway from atmospheric air as is the case with closed ventilation), and have not been capable of connection to ventilatory bags or other similar closed ventilation apparatus, as evidenced by the oval, rather than round, cross section at the exterior end of the airway tube.

What is therefore needed is a means for providing closed pulmonary ventilation of a patient without the difficulty and residual hoarseness associated with endotracheal intubation, and with better sealing than is available with face masks or conventional oropharyngeal airways while avoiding patient fright caused by having a mask placed over his or her face.

SUMMARY OF THE INVENTION

The present invention achieves the objectives and overcomes the disadvantages described above by providing a novel oropharyngeal airway and companion bite block assembly to provide a closed ventilation system, as an alternative to endotracheal intubation or the use of a face mask.

The oropharyngeal airway assembly of the invention, in its preferred embodiment, has a posterior airway tube portion having the same general configuration as conventional oropharyngeal tubes such as the Guedel airway, but an anterior tube portion which is modified so as to accommodate the standard connection to a ventilatory bag such as the Ambu resuscitator or other means for providing pressurized or enriched air of predetermined mixture. A bite block is fitted about the exterior of the airway tube between and comprises a tough, resilient U-shaped spacer block having vertically separated upper and lower tooth- or gum-engaging surfaces. A peripheral rim extends both above and below the spacer block to fit against the outer surfaces of the teeth or gums of the patient and inside the lips. An oval aperture extends through the base or central portion of the U-shaped spacer block, emerging between the laterally spaced sides of the U-shape. The airway tube is inserted through the aperture, forming a tight seal within the aperture and, when inserted into the patient's mouth, the posterior tube portion extends above the tongue to the upper throat, preventing the tongue from blocking the throat. The oval-shaped aperture, coupled with the resilient material of the bite block, is capable of matingly and frictionally accepting insertion of the airway while permitting limited longitudinal sliding of the airway tube with respect to the bite block for adjustment of the degree of insertion of the airway tube.

When the airway tube and bite block assembly have been thus properly placed in the patient's mouth and the nostrils occluded with conventional nostril occluding clips, a closed airway is provided by virtue of the oral seal between lips and bite block without the need for endotracheal intubation or face masks.

An annular shoulder around the anterior portion of the oropharyngeal tube limits the extent of insertion of the tube through the bite block, and a pair of small raised hemispherical areas located on the top and bottom, respectively, of the tube act as interference detents to hold the bite block and tube in the normal mated configuration to avoid unintentional withdrawal of the tube. The tube extends forward between the patient's lips, and a slightly tapered frustoconical connector or similar connector of substantially round cross section on the anterior portion of the tube sealingly mates with a standard ventilator or resuscitator bag for connecting the airway and bite block assembly to closed ventilating or resuscitating equipment.

A tight oral seal is provided by the airway and bite block assembly of the invention, even in the absence of